Let x=time the comet is within the earth's orbit;

then $2\pi\sqrt{\frac{a^3}{\mu}} : \frac{4}{3}\sqrt{\frac{a^3}{\mu}} = 1$ year : x. $\therefore x=\left(\frac{2}{3\pi}\right)^{th}$ part of a year

$=\frac{2}{3\pi}\times 365\frac{1}{4}$ days$=77.208+$days.

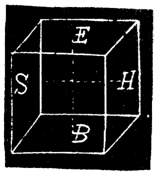
PROBLEMS.

20. Proposed by SAMUEL HART WRIGHT, M. D., M. A., Ph. D., Penn Yan, Yates County, New York.

When does The Dog-Star and the Sun rise together in Latitude 42° 30′ North=λ? Given the R. A. of Sirius=6 h. 40 m. 30 sec. and its Dec.= 16° 33′ 56″ S.

21. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Pennsylvania.

Solve (if possible) the following: A cube whose edge is a feet revolves on both axes—EB and SH—at the same number of revolutions per minute.



What is the volume of the figure generated, (a) when the center of the cube remains in one place, (b) when the center of the cube moves b feet in a straight line in a minute?

QUERIES AND INFORMATION

Conducted by J. M. COLAW, Monterey. Va. All contributions to this department should be sent to him.

Notes on Counsellor Dolman's Remarks In April Number.

By Professor John N. Lyle.

[Received May, 1894.]

Says Counsellor Dolman—"According to Lobatschewsky the angle-sum of a rectilineal triangle decreases as the area of the triangle increases, but is always less than two right angles."

What is a *rectilineal* triangle? The answer is, one whose sides are straight lines. "A triangle can be formed of three straight lines joining any three points." As three points determine the position of a plane, the surface of a rectilineal triangle is a plane.

The triangle whose angle sum is assumed to be less than two right angles is according to Lobatschewsky *rectilineal.* But Counsellor Dolman tells us that "His (Lobatschewsky's) straight line is not, (it is true), really straight." How can a triangle be called rectilineal whose sides are avowedly not straight? There is palpable contradiction here. If so, what becomes of the boasted consistency of Lobatschewsky's geometry?

Once introduce germinal error and the disease spreads.

The denial of the truth of Euclid's axiom 12 as a geometrical propósition has according to Counsellor Dolman's own showing led to wide spread demoralization in geometry. As a result of that denial we find that the angle-sum of a triangle is changed, that planes are warped, that straight lines are not "really straight", and that even space itself is transmitted into something said to be pseudo-spherical, different from the space which we know and in which all dwell whether they be common sense, Euclidian mathematicians or hyper-space, anti-Euclidian geniuses.

Counsellor Dolman thinks that I misapprehend the meaning of Lobatschewsky. Is he quite sure that Lobatschewsky would have admitted that "his geometry does not apply to the plane, nor to space as we know it"? Counsellor Dolman applied the adjectives "finite" and "infinite" to straight lines but does not tell us what he means by them. He objects to the definition that a finite straight line is one that has two ends. Why does he object? Has he some "infinite straight lines, each of which has two ends, that he wishes to exhibit to the court?

The Counsellor complains that I confound "infinite" and "boundless". Will he kindly explain the difference between an ' infinite" and a "boundless' straight line? Riemann makes the distinction between the "infinite" and "boundless" but it is unsatisfactory. I understand that Riemann accepts the Leibnitzian hierarcy of infinite quantities, some of which are an infinite number of times larger than others. Is that Counsellor Dolman's view also? Camplaint was made against Leibnitz and his school that they would not define what they meant by infinitely great and infinitely small quantities. Can we not always find *finite* quantity less than assigned *finite* quantity? Is there not a deal of juggling with the phrases "infitely small" and "less than any assignable quantity"?

If as the Counsellor informs us "Lobatschewsky's straight line is not really straight, but is the shortest distance between two points, and lying wholly in the given space," it would seem that not only is Euclid's postulate 1 eliminated from Lobatschewsky's space but also his straight line itself. The shortest distance between two points in Lobatschewsky's space, we are told, is not really a straight line. Can a really straight line be drawn in Lobatschewsky's space? If not, what becomes of postulate 1 of Euclid's elements and of Lobatschewsky's *rectilineal* triangle?

I would like to see a Lobatschewsky triangle before I die but if it is impossible to materialize the nondescript in "space as we know it" I suppose that I will have to forego the pleasure.

I will close by thanking Counsellor Dolman for his criticisms. I am quite as fond of having my errors pointed out as the non-Euclidians are of having theirs exposed. My honest opinion, however, is that the Counsellor defended more errors than he corrected.

A Reply to Mr. Draughon. By H. C. Whitaker.

[Received in September, 1894.]

In reply to Mr. Draughon with reference to the equation $\surd(x+4)-\surd(x-4)=4$, I cannot agree with him that the minus sign before the radical $\surd(x-4)$ must necessarily be one of operation and that the direction of $\surd(x-4)$ is still ambiguous. I regard the sign as a combination of the two. To illustrate,—In the early portions of Algebra, it is usual to give problems such as $9+(-7)=?$ $9-(+7)=?$ $9-(-7)=?$; later in the subject, in enunciating exercises, these operations are supposed to be performed, and the single sign is deemed sufficient; thus, instead of saying $9+(-7)$ or $9-(+7)$, simply $9-7$ is used and I think no ambiguity arises from its use.

Now if Mr. Draughon means to imply that mathematical convention has not established the usage that in a polynomial a single sign before a radical of the second degree is not sufficient to indicate a particular root, I could refer him I presume to a hundred and probably a thousand references in the works of our best mathematicians where exactly that assumption is made. This idea is fundamental in the problem of rationalizing the denominator of a surd fraction, and it is the basis of the discussion of symmetry in plotting equations. Let me quote a few words from Olney's University Algebra, page 131, where the discussion of the solution of $x^2+px=q$ is taken up, the value of x having been found to be $-\frac{p}{2}\pm\sqrt{\frac{p^2}{4}+q}$: "When p and q are both positive, $-\frac{p}{2}+\sqrt{\frac{p^2}{4}+q}$ is positive and $-\frac{p}{2}-\sqrt{\frac{p^2}{4}+q}$ is negative. When p is negative and q positive, if we take the plus sign of the radical, x is positive, but if we take the minus sign, x is negative" and so on. I believe that Mr. Draughon himself would calculate $3+\surd2$ to be $4.4142+$ and would be surprised if he were told the value was 1.5858 and would also be surprised if he were told that the expression as above written has no meaning, and that in order to make it intelligible, it must be written either $3++\surd2$ or $3--\surd2$. For myself, I see no advantage in using the two signs, and hope that, if Mr. Draughon advocates their use, the mathematical world will not adopt his suggestion. No discourtesy to Mr D. intended.

But even adopting this suggestion, we are as badly off as ever in answering L. B's question, if he amends it to read $+\surd(x+4)+-\surd(x-4)=4$, where the sign before the radicals now clearly indicates direction.